REMARKS

Claims 1 – 28 remain in the application and stand rejected. The rejection of the claims is respectfully traversed.

The Examiner asserts that claims 1 – 4, 9 – 15, 21 – 23 and 27 – 28 are unpatentable over Hunt et al. (U.S. Patent No. 6,629,123) in view of French et al. (U.S. Patent No. 6,266,053) under 35 U.S.C. §103(a). The Examiner also asserts that claims 5 – 8, 16 – 20, and 24 – 26 are unpatentable over Hunt et al. and French et al. further in view of either or both of Dave (U.S. Patent No. 6,230,303) and Padberg et al. under 35 U.S.C. §103(a). The rejection is respectfully traversed.

The Examiner, essentially uses a common rationale for rejecting the task management method of independent claim 1, the distributed processing system of claim independent 12 and the program product of independent claim 21. In rejecting independent claim 1 the Examiner typically asserts that "Hunt discloses a task management method for determining optimal placement of task components," or at least 3 of the 4 steps recited in claim 1. The Examiner asserts that the first recited step (a) of "generating a communication graph representative of a task" is disclosed by Hunt et al. at "col. 23 lines 13-23, 'the application units and inter-unit communication form a commodity flow network', wherein the application units are components of a task or an application program, and the inter-unit communication provides information pertaining to the weighting of edges... ." Not finding hunt et al. to teach identifying independent nets as recited in the second step, the Examiner proceeds to the third step (c) of "determining a min cut for each independent net" (claim 1, lines 4 – 5). Thus, the Examiner asserts that "determining a min cut for the **communication graph**" is sufficient and is disclosed in Hunt et al. at "col. 24 lines 8-28, 'the algorithm to map a client-server distributed partitioning problem onto the MIN-CUT problem is as follows', wherein the algorithm for determining the minimum cut of the graph is disclosed" (emphasis added). For the fourth step (d) of "placing task components responsive to said min cut determined for

each independent net" (claim 1, lines 6 – 7), the Examiner asserts is "placing task components responsive to said min cut determined for the **communication graph**" That the Examiner asserts is disclosed by Hunt et al. at "col. 23 lines 13-23, 'After all data has been gathered, it is the optimization algorithm that decides where application units will be placed on the network', wherein the optimization algorithm is a minimum cut algorithm and finds the paths of minimal communication costs" (emphasis added).

Thus, the Examiner looks to French et al. to disclose step (b) at "col. 19 line 54 - col. 20 line 3, 'When a graph 40 becomes very large, or a project is being worked on by several people, it will be natural to partition the task into several sub-graphs. These can be distinct graphs, with separate sources and sinks." While this does suggest partitioning a graph, it does not disclose "identifying independent nets in said communication graph" as recited in claim 1. *Supra.* Be that as it may, from this graph partitioning suggestion, the Examiner concludes that it "would have been obvious to one of ordinary skill in the art to combine Hunt with French since in cases where a particular task is large, the time required to generate a minimum cost cut of the graph may prove to be prohibitively high. Thus, to modify Hunt with French would have been obvious in order to calculate minimum costs for smaller graphs, while maintaining data dependencies between the sub-graphs, such that all communication links are still intact." Perhaps, but portioning a graph as suggested by French et al., finding min cuts of the partitions and placing task according to the min cut, still does not result in the present invention as claimed.

A finding of obviousness requires that "the differences between the subject matter sought to be patented and the prior art are such that **the subject matter as a whole** would have been obvious" (emphasis added) as recited in 35 U.S.C. §103(a). Therefore, to "support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Furthermore, an obviousness rejection cannot be based on the resort to various (non-pertinent) references and the combination of bits and pieces of the references in the light of Applicants' teachings. An extensive discussion of the criteria to be applied in obviousness rulings is set forth in *Aqua-Aerobic Systems Inc. v. Richards of Rockford Inc.*, 1 U.S.P.Q. 2d 1945, 1955-57 (N.D. Ill. 1986). "The fact that a prior art reference can be modified to show the patented invention does not make the modification obvious unless the prior art reference suggests the desirability of the modification. An attempted modification of a prior art reference that is **unwarranted by the disclosure** of that reference is improper." *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984) (emphasis added). *See also, In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) (Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." 916 F.2d at 682, 16 USPQ2d at 1432.).

Hunt et al. teaches "An automatic distributed partitioning system (ADPS) intercepts function calls to unit activation functions that dynamically create application units, such as a component instantiation function." *See*, Hunt et al. Abstract. A "distribution optimization algorithm accepts a model of the decision problem and ... decides where application units will be placed in the network." *Id*, col. 23, lines 13 – 17. "[T]he application units and inter-unit communication form a commodity flow network. After this mapping, known graph-cutting algorithms can be used for automatic distributed partitioning." *Id*, lines 20 – 23. Finally, Hunt et al. teaches that "the minimum cut contains edges with the smallest weights (capacities), those edges represent the line of minimum communication between the client and server." *Id*, col. 24, lines 25 – 28.

French et al. teaches a "technique for representing a visual scene as a directed acyclic graph of data" wherein, "the graph is traversed in a direction from a root node down toward the leaf nodes, thereby causing temporal transformations specified along the branches of the graph to modify time parameters of the scene data at the nodes. Child nodes are preferably evaluated after being transformed, to determine the extent to which

they contribute the data to the final scene. *See*, French et al. Abstract, lines 1 – 18. With regard to partitioning, French et al. provides that [w]hen a graph 40 becomes very large, or a project is being worked on by several people, it will be natural to partition the task into several sub-graphs. These can be distinct graphs, with separate sources and sinks, **but that would break the dependency between the sub-graphs.**" (emphasis added) Id, col. 19, lines 54 – 58. Thus, French et al. is clearly not concerned with partitioning independent sub-graphs or nets from the graph. It is also clear from French et al. that graph traversal as described at col. 10, line 39 – col. 11, line 43 is with reference to traversing the graph from a root node. "Nodes with no ancestors are known as root nodes 43." French et al., col. 8, lines 1 – 2.

A noted hereinabove, the task management method, the distributed processing system and the program product of the present invention operate on a communication graph of the task. *See*, e.g., claim 1, line 3. Independent nets are identified in the communication graph. *See*, e.g., line 4. "Two nets are independent if none of the non-terminal nodes of one net shares an edge with a non-terminal node of the other." The specification, page 6, line 24 – page 7, line 1. Selection of independent nets is recited in claims 4 – 7, 15 – 17 and 23 – 25. A min cut is determined for each independent net and task components determined for each independent net based on the min cut. *See*, e.g., claim 1, lines 5 – 7.

While French et al. may suggest some partition, there is a clear indication of lack of awareness of any need to identify independent nets, much less a suggestion to do so. Specifically, French et al. does not teach or suggest identifying in the graph "independent net(s that are each) a subset of components that do not communicate with any other subset of components" as recited in the specification at page 10, lines 18 – 20. *See also*, independent nets 182 and 184 in graph 180 of Figure 4 and the discussion of Figure 5 on pages 10 – 11. Accordingly, because French et al. does not teach identifying independent nets in a task graph, combining French et al. with Hunt et al. does not result in the present invention, as claimed in any of claims 1, 12 or 21. Therefore, independent claims 1, 12

and 21 are patentable over French et al. in combination with Hunt et al. under 35 U.S.C. §103(a).

Similarly, since dependent claims include all of the differences with the references as the claims from which they depend, claims 2 – 3, 9 – 11, 13 – 14, 22 – 23 and 27 – 28, which depend from claims 1, 12 or 21, are patentable over French et al. in combination with Hunt et al. under 35 U.S.C. §103(a).

Furthermore, regarding the rejection of dependent claims 4, 15 and 23, the Examiner asserts, e.g., with respect to claim 4, that the steps of identifying independent nets is shown by the graph traversal of French et al. at col. 10, line 39 – col. 11, line 63. The Examiner dismisses "selecting a seed node for an independent net" (e.g., claim 4, line 3) with an assertion that it is shown in French et al. by "Traversals of the graph 40 are initiated by an external change to a traversal context which is referenced from a root 43 of the graph 40." Thus, essentially, the thrust of the Examiner's argument is that traversing a graph from a root node as taught by French et al., is the same as partitioning the graph "into subgraphs that are independent nets by repeatedly picking a 'seed node' **from nodes remaining** in the communication graph and branching out until terminal nodes have been reached along all paths." *See*, the specification, page 10, lines 16 – 18, (emphasis added). These two things are clearly quite different. As noted hereinabove, French et al. indicates that not all nodes are root nodes, only nodes "with no ancestors are known as root nodes 43." *Supra.*

The Examiner further dismisses "identifying nodes adjacent to said seed node as perimeter nodes belonging to said independent net, perimeter nodes being an outer perimeter of nodes identified as belonging to said independent net" (see, e.g., claim 4, lines 4 – 6) with an assertion that it is shown in French et al. by "'There are two ways to implement traversals of the graph. The first approach is to consider a conventional explicit depth-first traversal of the DAG', wherein the traversal continues by visiting the children of each node, i.e. adjacent nodes, recursively". This passage from French et al.

is silent on perimeter nodes and only discloses the limited traversal resulting from starting at root nodes and traversing the graph to leaves. While leaves may be perimeter nodes, perimeter nodes are not necessarily leaves. *See e.g.*, the specification, page 11, line 5.

Additionally, although the Examiner asserts that "identifying nodes adjacent to said perimeter nodes as belonging to said independent net, said identified adjacent nodes being identified as perimeter nodes" (see, e.g., claim 4, lines 7 – 8) is disclosed by "the downstream connections are recursively traversed"; since a temporary sub-graph perimeter has not been established by selecting a seed node, identifying perimeter nodes from the seed node and expanding the perimeter, this recitation from French et al. can only describe traversing the graph from root nodes. Accordingly, traversing a graph from a root node is quite different than partitioning the graph "into subgraphs that are independent nets by repeatedly picking a 'seed node' from nodes remaining in the communication graph and branching out (from the seed node) until terminal nodes have been reached along all paths." French et al. in combination with Hunt et al. does not result in the present invention as recited any of claims 1, 12, 21 or 4, 15 and 23. Reconsideration and withdrawal of the rejection of claims 1 – 4, 9 – 15, 21 – 23 and 27 – 28 over Hunt et al. in view of French et al. under 35 U.S.C. §103(a) is respectfully solicited.

Regarding the rejection of claims 5 – 8, 16 – 20, and 24 – 26 over Hunt et al. and French et al. further in view of either or both of Dave and Padberg et al. under 35 U.S.C. §103(a), neither Dave nor Padberg et al. adds anything to either of Hunt et al. or French et al. to result in the present invention as recited in any of independent claims 1, 12, 21, much less claims 5 – 8, 16 – 20, and 24 – 26, which depend thereform. Accordingly, the combination of Dave and/or Padberg et al. with Hunt et al. and French et al. still does not result in the invention as claimed in claims 5 – 8, 16 – 20, and 24 – 26. Reconsideration and withdrawal of the rejection of claims 5 – 8, 16 – 20, and 24 – 26 over Hunt et al. and

French et al. with either or both of Dave and Padberg et al. under 35 U.S.C. §103(a) is respectfully solicited.

The Applicants not e also that for the suggestion as well as the motivation to combine, the Examiner asserts that "in cases where a particular task is large, the time required to generate a minimum cost cut of the graph may prove to be prohibitively high. Thus, to modify Hunt with French would have been obvious in order to calculate minimum costs for smaller graphs, while maintaining data dependencies between the sub-graphs, such that all communication links are still intact." Other than the result of the combination or alleged advantages from such a combination, the Examiner did not provide any suggestion in any reference of record for a basis of the combination, nor did the Examiner provide a teaching or suggestion in any reference of how to combine. Accordingly, the Examiner has failed to make a case of *prima facie* obviousness. It is apparent that the Examiner is using the present application for the suggestion to combine and to teach how to combine to result in the claimed invention. Such a use of the application, in hindsight to suggest or to teach the combination, is improper.

Accordingly, because combination of the teaching of French et al. with Hunt et al. does not result in the present invention, as claimed; because there is no suggestion to combine in any reference of record; and, because the Examiner has used the application in improper hindsight for the suggestion to combine, the present invention is not obvious under 35 U.S.C. § 103(a). Reconsideration and withdrawal of the rejection of claims 1 – 28 under 35 U.S.C. § 103(a) is respectfully solicited.

The applicants have considered the other references cited but not relied upon in the rejection and find them to be no more relevant than the references upon which this rejection is based.

The applicants thank the Examiner for efforts, both past and present, in examining the application. Believing the application to be in condition for allowance, both for the

amendment to the specification and for the reasons set forth above, the applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 1 – 28 under 35 U.S.C. §103(a) and allow the application to issue.

Should the Examiner believe anything further may be required, the Examiner is requested to contact the undersigned attorney at the local telephone number listed below for a telephonic or personal interview to discuss any other changes.

Please charge any deficiencies in fees and credit any overpayment of fees to IBM Corporation Deposit Account No. 50-0510 and advise us accordingly.

Respectfully Submitted,

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